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Docket No. AUS990796US1

Assistant Commissioner for Patents  
Washington, D.C. 20231

Sir:

Transmitted herewith for filing is the patent application of Inventor(s):

**SANAA F. ABDELHADI, MARITZA BORUNDA, AND HYPATIA ROJAS**

For: **METHOD AND APPARATUS FOR PRINTING WEB PAGES**

Enclosed are also:

- ☒ 21 Pages of Specification including an Abstract
- ☒ 7 Pages of Claims
- ☒ 7 Sheet(s) of Drawings
- ☒ A Declaration and Power of Attorney
- ☒ Form PTO 1595 and assignment of the invention to IBM Corporation

**CLAIMS AS FILED**

FOR	Number Filed		Number Extra		Rate		Basic Fee (\$760)
Total Claims	34	-20 =	14	X	\$ 18	=	\$252.00
Independent Claims	7	-3 =	4	X	\$ 78	=	\$312.00
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<b>Total Filing Fee</b>							<b>= \$1,324.00</b>

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Voel Emile

Reg. No. 39,969

Intellectual Property Law Dept.

IBM Corporation

11400 Burnet Road 4054

Austin, Texas 75758

Telephone: (512) 823-1005

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## METHOD AND APPARATUS FOR PRINTING WEB PAGES

### BACKGROUND OF THE INVENTION

#### 5 1. Technical Field:

The present invention relates generally to an improved data processing system and in particular to a method and apparatus for outputting data to a device. Still more particularly, the present invention provides a  
10 method and apparatus for printing Web pages containing links.

#### 2. Description of Related Art:

The Internet, also referred to as an "internetwork",  
15 is a set of computer networks, possibly dissimilar, joined together by means of gateways that handle data transfer and the conversion of messages from the sending network to the protocols used by the receiving network (with packets if necessary). When capitalized, the term "Internet"  
20 refers to the collection of networks and gateways that use the TCP/IP suite of protocols.

The Internet has become a cultural fixture as a source of both information and entertainment. Many businesses are creating Internet sites as an integral part  
25 of their marketing efforts, informing consumers of the products or services offered by the business or providing other information seeking to engender brand loyalty. Many federal, state, and local government agencies are also employing Internet sites for informational purposes,  
30 particularly agencies which must interact with virtually all segments of society such as the Internal Revenue

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Service and secretaries of state. Providing informational guides and/or searchable databases of online public records may reduce operating costs. Further, the Internet is becoming increasingly popular as a medium for  
5 commercial transactions.

Currently, the most commonly employed method of transferring data over the Internet is to employ the World Wide Web environment, also called simply "the Web". Other Internet resources exist for transferring  
10 information, such as File Transfer Protocol (FTP) and Gopher, but have not achieved the popularity of the Web. In the Web environment, servers and clients effect data transaction using the Hypertext Transfer Protocol (HTTP), a known protocol for handling the transfer of various  
15 data files (e.g., text, still graphic images, audio, motion video, etc.). The information in various data files is formatted for presentation to a user by a standard page description language, the Hypertext Markup Language (HTML). In addition to basic presentation  
20 formatting, HTML allows developers to specify "links" to other Web resources identified by a Uniform Resource Identifier (URI) such as a Uniform Resource Locator (URL). A URL is a special syntax identifier defining a communications path to specific information. Each  
25 logical block of information accessible to a client, called a "page" or a "Web page", is identified by a URL. The URL provides a universal, consistent method for finding and accessing this information, not necessarily for the user, but mostly for the user's Web "browser". A  
30 browser is a program capable of submitting a request for information identified by a URL at the client machine.

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Retrieval of information on the Web is generally accomplished with an HTML-compatible browser.

In some cases, a user may desire to obtain a hard copy of one or more Web pages. In many cases, the user  
5 may desire to print out a copy of an article or some other content on a Web site. In some cases, the entire article or the desired content may be printed all at once. In other cases, the article or desired content may be divided up into many different pages which are linked  
10 to each other by URLs. In this situation, the user must print a page. This page may contain a number of links pointing to other pages containing other portions of the article or desired content. Each of these links must be visited by the user and then printed. Such a process  
15 becomes tedious and difficult when large number of links are present.

Therefore, it would be advantageous to have an improved method and apparatus for printing web pages.

10

The present invention provides a method and apparatus in a data processing system for printing web pages. A request to print a web page is received. The web page is printed and each web page associated with the web page on selected levels below the web page also are printed.

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### BRIEF DESCRIPTION OF THE DRAWINGS

5 The novel features believed characteristic of the invention are set forth in the appended claims. The invention itself, however, as well as a preferred mode of use, further objectives and advantages thereof, will best be understood by reference to the following detailed description of an illustrative embodiment when read in  
10 conjunction with the accompanying drawings, wherein:

**Figure 1** depicts a pictorial representation of a distributed data processing system in which the present invention may be implemented;

**Figure 2** is a block diagram depicts a data processing  
15 system that may be implemented as a server in accordance with a preferred embodiment of the present invention;

**Figure 3** is a block diagram illustrates a data processing system in which the present invention may be implemented;

**Figure 4** is a diagram illustrating a print process depicted in accordance with a preferred embodiment of the present invention;

**Figure 5** is a diagram illustrating printing of Web pages depicted in accordance with a preferred embodiment  
25 of the present invention;

**Figure 6** is a diagram illustrating Web page link printing depicted in accordance with a preferred embodiment of the present invention;

**Figure 7** is a flowchart of a process for Web page  
30 link printing depicted in accordance with a preferred embodiment of the present invention; and

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**Figure 8**, a flowchart of a process for selecting and printing links is depicted in accordance with a preferred embodiment of the present invention.

65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

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### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference now to the figures, **Figure 1** depicts a  
5 pictorial representation of a distributed data processing  
system in which the present invention may be implemented.  
Distributed data processing system **100** is a network of  
computers in which the present invention may be  
implemented. Distributed data processing system **100**  
10 contains a network **102**, which is the medium used to  
provide communications links between various devices and  
computers connected together within distributed data  
processing system **100**. Network **102** may include permanent  
connections, such as wire or fiber optic cables, or  
15 temporary connections made through telephone connections.

In the depicted example, a server **104** is connected to  
network **102** along with storage unit **106**. In addition,  
clients **108**, **110**, and **112** also are connected to network  
**102**. These clients **108**, **110**, and **112** may be, for example,  
20 personal computers or network computers. For purposes of  
this application, a network computer is any computer,  
coupled to a network, which receives a program or other  
application from another computer coupled to the network.  
In the depicted example, server **104** provides data, such as  
25 boot files, operating system images, and applications to  
clients **108-112**. Clients **108**, **110**, and **112** are clients to  
server **104**. Web pages and other contents may be printed in  
a hard copy form using printers, such as printers **114** and  
**116**. The printing may take place locally or remotely.

30 Distributed data processing system **100** may include



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additional servers, clients, and other devices not shown.  
In the depicted example, distributed data processing  
system **100** is the Internet with network **102** representing a  
worldwide collection of networks and gateways that use the  
5 TCP/IP suite of protocols to communicate with one another.  
At the heart of the Internet is a backbone of high-speed  
data communication lines between major nodes or host  
computers, consisting of thousands of commercial,  
government, educational and other computer systems that  
10 route data and messages. Of course, distributed data  
processing system **100** also may be implemented as a number  
of different types of networks, such as for example, an  
intranet, a local area network (LAN), or a wide area  
network (WAN). **Figure 1** is intended as an example, and not  
15 as an architectural limitation for the present invention.

Referring to **Figure 2**, a block diagram depicts a data  
processing system that may be implemented as a server,  
such as server **104** in **Figure 1**, in accordance with a  
preferred embodiment of the present invention. Data  
20 processing system **200** may be a symmetric multiprocessor  
(SMP) system including a plurality of processors **202** and  
**204** connected to system bus **206**. Alternatively, a single  
processor system may be employed. Also connected to  
system bus **206** is memory controller/cache **208**, which  
25 provides an interface to local memory **209**. I/O bus bridge  
**210** is connected to system bus **206** and provides an  
interface to I/O bus **212**. Memory controller/cache **208** and  
I/O bus bridge **210** may be integrated as depicted.

Peripheral component interconnect (PCI) bus bridge  
30 **214** connected to I/O bus **212** provides an interface to PCI

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local bus **216**. A number of modems may be connected to PCI bus **216**. Typical PCI bus implementations will support four PCI expansion slots or add-in connectors. Communications links to network computers **108-112** in

- 5 **Figure 1** may be provided through modem **218** and network adapter **220** connected to PCI local bus **216** through add-in boards.

Additional PCI bus bridges **222** and **224** provide interfaces for additional PCI buses **226** and **228**, from  
10 which additional modems or network adapters may be supported. In this manner, data processing system **200** allows connections to multiple network computers. A memory-mapped graphics adapter **230** and hard disk **232** may also be connected to I/O bus **212** as depicted, either  
15 directly or indirectly.

Those of ordinary skill in the art will appreciate that the hardware depicted in **Figure 2** may vary. For example, other peripheral devices, such as optical disk drives and the like, also may be used in addition to or in  
20 place of the hardware depicted. The depicted example is not meant to imply architectural limitations with respect to the present invention.

The data processing system depicted in **Figure 2** may be, for example, an IBM RISC/System 6000 system, a product  
25 of International Business Machines Corporation in Armonk, New York, running the Advanced Interactive Executive (AIX) operating system.

With reference now to **Figure 3**, a block diagram illustrates a data processing system in which the present  
30 invention may be implemented. Data processing system **300**

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is an example of a client computer. Data processing system **300** employs a peripheral component interconnect (PCI) local bus architecture. Although the depicted example employs a PCI bus, other bus architectures such as Accelerated Graphics Port (AGP) and Industry Standard Architecture (ISA) may be used. Processor **302** and main memory **304** are connected to PCI local bus **306** through PCI bridge **308**. PCI bridge **308** also may include an integrated memory controller and cache memory for processor **302**.

Additional connections to PCI local bus **306** may be made through direct component interconnection or through add-in boards. In the depicted example, local area network (LAN) adapter **310**, SCSI host bus adapter **312**, and expansion bus interface **314** are connected to PCI local bus **306** by direct component connection. In contrast, audio adapter **316**, graphics adapter **318**, and audio/video adapter **319** are connected to PCI local bus **306** by add-in boards inserted into expansion slots. Expansion bus interface **314** provides a connection for a keyboard and mouse adapter **320**, modem **322**, and additional memory **324**. Small computer system interface (SCSI) host bus adapter **312** provides a connection for hard disk drive **326**, tape drive **328**, and CD-ROM drive **330**. Typical PCI local bus implementations will support three or four PCI expansion slots or add-in connectors.

An operating system runs on processor **302** and is used to coordinate and provide control of various components within data processing system **300** in **Figure 3**. The operating system may be a commercially available operating system such as OS/2, which is available from International

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Business Machines Corporation. "OS/2" is a trademark of International Business Machines Corporation. An object oriented programming system such as Java may run in conjunction with the operating system and provides calls  
5 to the operating system from Java programs or applications executing on data processing system **300**. "Java" is a trademark of Sun Microsystems, Inc. Instructions for the operating system, the object-oriented operating system, and applications or programs are located on storage  
10 devices, such as hard disk drive **326**, and may be loaded into main memory **304** for execution by processor **302**.

Those of ordinary skill in the art will appreciate that the hardware in **Figure 3** may vary depending on the implementation. Other internal hardware or peripheral  
15 devices, such as flash ROM (or equivalent nonvolatile memory) or optical disk drives and the like, may be used in addition to or in place of the hardware depicted in **Figure 3**. Also, the processes of the present invention may be applied to a multiprocessor data processing  
20 system.

For example, data processing system **300**, if optionally configured as a network computer, may not include SCSI host bus adapter **312**, hard disk drive **326**, tape drive **328**, and CD-ROM **330**, as noted by dotted line  
25 **332** in **Figure 3** denoting optional inclusion. In that case, the computer, to be properly called a client computer, must include some type of network communication interface, such as LAN adapter **310**, modem **322**, or the like. As another example, data processing system **300** may  
30 be a stand-alone system configured to be bootable without relying on some type of network communication interface,

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whether or not data processing system **300** comprises some type of network communication interface. As a further example, data processing system **300** may be a Personal Digital Assistant (PDA) device which is configured with  
5 ROM and/or flash ROM in order to provide non-volatile memory for storing operating system files and/or user-generated data.

The depicted example in **Figure 3** and above-described examples are not meant to imply architectural  
10 limitations. For example, data processing system **300** also may be a notebook computer or hand held computer in addition to taking the form of a PDA. Data processing system **300** also may be a kiosk or a Web appliance.

The present invention provides a method, apparatus,  
15 and instructions for outputting content from a Web page or set of Web pages to an output device. The present invention allows for a user to print a Web page and a selected number of other pages linked to this page, directly or indirectly, on lower levels. In particular,  
20 the mechanism of the present invention receives a request to print a particular Web page. This Web page is printed along with all other Web pages located on selected levels below the particular Web page. The number of levels below the selected Web page may be selected by a user or  
25 may be based on a default value. The environment in which the mechanism operations is discussed in more detail below.

With reference now to **Figure 4**, a diagram illustrating a print process is depicted in accordance  
30 with a preferred embodiment of the present invention. In this example, the user at client **400** requests pages from

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5 a server **402**. Specifically, requests are generated using  
a browser **404**. As used herein a browser is a client  
application that enables a user to view content in  
distributed data processing system. In these examples, a  
Web browser is illustrated, allowing HTML documents on  
the World Wide Web, another network, or the user's  
computer to be viewed. Also, browser **404** may be used to  
follow hyperlinks in the documents among them as well as  
transfer files. Browser **400** includes a connection that  
10 can handle IP packets as well display graphics that are  
in the document, play audio and video files, and execute  
small programs, such as Java applets, that can be  
embedded in HTML documents. Some Web browsers use helper  
applications or plug-ins to accomplish one or more of  
15 these tasks.

The request is received at a request engine **406**  
located in server **402**. Request engine **406** queries Web  
page database **408** for a Web page matching the request  
from client **400**. A Web page **410** matching the request in  
20 Web page database **408** is returned to browser **404** in  
client **400** via request engine **406**. In this example, the  
user at client **400** may decide to print Web page **410** using  
browser **404**. This Web page is printed using printer  
driver **412** in this example. Furthermore, Web page **410**  
25 may be actually printed at a printer located remotely  
from client **400**. The mechanism of the present invention  
identifies all of the links within Web page **410** and  
retrieves those pages for printing. The retrieved pages  
may be parsed or reviewed for links. The pages to these  
30 links also may be retrieved for printing. Each

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successive Web page is considered another level. In these examples, the number of levels may be set by the user or through a default value. This printing of Web pages is also referred to as Web page link printing.

- 5 The mechanism of the present invention may be implemented in a number of places. For example, the mechanism may be implemented as a plug-in in a Web browser or as a print driver. A "plug-in" is a small software program that plugs into a larger application to provide added
- 10 functionality. Alternatively, the mechanism may be located on a server, which returns all of the pages to a client for printing in response to a request to print a Web page.

- Turning now to **Figure 5**, a diagram illustrating printing of Web pages is depicted in accordance with a preferred embodiment of the present invention. In this example, a Web page **500** is selected for printing using the mechanism of the present invention. Web page **500** is at level 0 in this example. Link **502** in Web page **500** is
- 15 identified and Web page **504** is retrieved as the content associated with link **502**. Web page **504** is identified as being in level 1 in this example. Link **506** in Web page is identified and Web page **508** is retrieved. Web page **508** is at level 2.

- 25 Each of these Web pages, Web pages **500**, **504**, and **508** may be printed as they are retrieved or after all of the pages have been retrieved. Only one link is identified for each level below level 0 for printing in relation to the Web pages. Of course in actual practice, all of links
- 30 for each Web page on each level are identified with the associated Web pages being retrieved for printing.

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Turning next to **Figure 6**, a diagram illustrating Web page link printing is depicted in accordance with a preferred embodiment of the present invention. In this example, a user has selected Web page **600** for printing  
5 along with printing associated Web pages two levels down from Web page **600**.

Web page **600** is located at level 0 and contains three links **602-606**. These three links are associated with Web pages **608-612**. Web pages **608-612** are located on  
10 level 1 in this example. Web page **608** is accessed using link **602**, Web page **610** is accessed using link **604**, and Web page **612** is accessed using link **606**. Web page **608** contains links **614** and **616**. Web page **610** contains links **618** and **620**. Web page **612** contains a single link, link  
15 **622**.

Level 2 contains Web pages **624-632**. Web page **624** is accessed using link **614** in Web page **608**. Web page **626** is accessed using link **616** in Web page **608**. Web pages **628** and **630** are accessed using links **618** and **620** in Web page  
20 **610**. Web page **632** is accessed using link **622** in Web page **612**. Web pages **624**, **626**, and **632** contain links **634-642**. The pages associated with these links are not retrieved because they are located on a level lower than the one specified by the user. Also, in this example, Web page  
25 **632** contains a link returning to a previous level. In particular, link **640** in this example is tied to link **604** in Web page **600**. The mechanism of the present invention does not process the link such that a recursive loop occurs. The tracking of prior paths may be performed in  
30 a number of ways. For example, all links that have been



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selected for printing may be stored in a hash table in which each entry contains a URL and a file name. If the mechanism of the present invention identifies a link that matches an entry into hash table, this link is not  
5 retrieved or printed. The prior path is identified and remains unfollowed.

Using the mechanism of the present invention, all of the Web pages on levels 0-2 are printed in response to a selection of page **600** for printing. The other pages are  
10 retrieved and printed without the user having to select each link for each page and printing a page after it has been retrieved. Instead, the user is able to select a single page and a depth or level to which printing should occur.

15 Additionally, the present invention also may allow a user to select selected pages on different levels for printing. For example, a user may see twenty links on a page, but choose not to print all twenty of the pages below. In such a case, the user may select a subset of  
20 the links for printing. Only those selected links would be traversed by the mechanism of the present in printing pages.

With reference now to **Figure 7**, a flowchart of a process for Web page link printing is depicted in  
25 accordance with a preferred embodiment of the present invention. The process begins by receiving a request to print a Web page (step **700**). A determination is made as to whether multi-level printing is to be performed (step **702**). This determination is made in response to a user  
30 input. For example, a prompt may be displayed to the user asking whether mulit-level printing is to be

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performed. If multi-level printing is to occur, a determination is then made as to whether a level has been selected (step **704**). The level may be selected by a prompt to the user or through some other input mechanism.

- 5 If a level has been selected, the maximum depth is set equal to the selected level (step **706**). A level index *i* is set equal to zero (step **708**).

- The process then identifies links in each of the retrieved Web pages (step **710**). In the first pass, only  
10 a single Web page is present. This page is the Web page selected by the user for printing. On subsequent passes, more than one page may be present for printing. The index *i* is incremented by one (step **712**). Thereafter, prior paths are identified and eliminated (step **714**).  
15 This step is used to prevent the process from being stuck in a recursive loop. Paths to pages previously accessed are ignored using step **714**.

- Next, Web pages are retrieved for the identified links (step **716**). The Web pages are then printed (step  
20 **718**). The first pass through step **718** includes printing the Web page selected by the user. Thereafter, a determination is made as to whether the index *i* is equal to the maximum depth (step **720**). If the index *i* is equal to the maximum depth, the process terminates. Otherwise,  
25 the process returns to step **710**.

- With reference again to step **704**, if the level was not selected by the user, the maximum depth is set equal to a default value (step **722**) with the process then proceeding to step **708** as described above. Turning back  
30 to step **702**, if multi-level printing has not be selected,

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the Web page identified in the request back in step **700** is printed (step **724**) with the process terminating thereafter.

With reference now to **Figure 8**, a flowchart of a process for selecting and printing links is depicted in accordance with a preferred embodiment of the present invention. The process begins by loading a page for display to the user (step **800**). Thereafter, a determination is made as to whether a link has been selected by the user for printing (step **802**). If a link has been selected, the link is stored in a table (step **804**). Thereafter, the link is displayed in a "tag" form (step **806**) with the process returning to step **802**. This display of link may be using some symbol in association with the link or by highlighting the link or displaying the link in a different color. With reference again to step **802**, if no more links are selected, the process then terminates. The process in **Figure 8** generates a table of links that may be used in the process illustrated in **Figure 7**. In such a case, each link that has been tagged or selected by the user is treated as a separate request to print a Web page. Alternatively, the process may be implemented such that only links selected by a user are retrieved and printed.

Thus, the present invention provides an improved method and apparatus for printing content, such as Web pages having links or associations with other Web pages. A depth or level of printing is selected for the content and all of the content down to the selected level is retrieved and printed. The mechanism of the present invention may be applied to other content other than Web

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pages. Files identified by links in Web pages also may be retrieved and printed. Further, content located in tree structures, such as files in directories arranged in a hierarchical fashion, may be printed using the  
5 mechanism of the present invention. In such a case, a directory or file may be selected for printing. Files located in subdirectories are identified and retrieved for printing.

It is important to note that while the present  
10 invention has been described in the context of a fully functioning data processing system, those of ordinary skill in the art will appreciate that the processes of the present invention are capable of being distributed in the form of a computer readable medium of instructions  
15 and a variety of forms and that the present invention applies equally regardless of the particular type of signal bearing media actually used to carry out the distribution. Examples of computer readable media include recordable-type media such a floppy disc, a hard  
20 disk drive, a RAM, and CD-ROMs and transmission-type media such as digital and analog communications links.

The description of the present invention has been presented for purposes of illustration and description, but is not intended to be exhaustive or limited to the  
25 invention in the form disclosed. Many modifications and variations will be apparent to those of ordinary skill in the art. For example, the mechanism of the present invention may be located in various components. One location is as a plug-in in a Web browser. Another  
30 location may be as a print driver that is selectable by the user when the user desires to perform multi-level

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printing. In such a case, the "print driver" would perform the step necessary to identify content on lower levels, retrieve the content, and print the content. The printing may be accomplished by directing the content to  
5 a typical print driver, such as one for a laser printer. Additionally, the content may be output to other output devices other than a printer. For example, the content may be directed to a display or even to a file. The embodiment was chosen and described in order to best  
10 explain the principles of the invention the practical application and to enable others of ordinary skill in the art to understand the invention for various embodiments with various modifications as are suited to the particular use contemplated.

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**CLAIMS:**

What is claimed is:

1. A method in a data processing system for printing  
5 web pages, the method comprising the data processing  
system implemented steps of:  
    receiving a request to print a web page; and  
    printing the web page and each web page associated  
with the web page.
- 10 2. The method of claim 1, wherein the printing step  
prints the Web page in each Web page associated with the  
Web page on selected levels below the Web page.
3. The method of claim 2, wherein the printing step  
15 comprising:  
    sending the web page and each web page associated  
with the web page on selected levels below the web page  
to a printer.
- 20 4. The method of claim 2, wherein the printing step  
comprising:  
    sending the web page and each web page associated  
with the web page on selected levels below the web page  
to a display device.
- 25 5. The method of claim 2, wherein the printing step  
comprising:  
    sending the web page and each web page associated  
with the web page on selected levels below the web page  
30 to a file.

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6. The method of claim 2, wherein the data processing system is a client computer.

7. The method of claim 2, wherein the data processing  
5 system is a web server.

8. A method in a data processing system for printing web pages, the method comprising the data processing system implemented steps of:

10 responsive to an input selecting a current web page for printing, determining whether a maximum depth for printing has been reached;

identifying a set of universal resource identifiers located within the current web page in response to the  
15 maximum depth being unreached;

retrieving the web page identified by the set of uniform resource locators; and

printing each web page retrieved.

20 9. The method of claim 8 further comprising:  
repeating the determining, identifying, retrieving, and printing steps for each web page until the maximum depth has been reached.

25 10. The method of claim 8, wherein the printing step comprises sending each web page to an output device.

11. The method of claim 10, wherein the output device is a printer.

30 12. The method of claim 10, wherein the output device is

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a display device.

13. The method of claim 8, wherein the data processing system is a client computer.

5

14. The method of claim 8, wherein the data processing system is a web server.

15. The method of claim 8, wherein the determining,  
10 identifying, and retrieving steps are performed in a web server and wherein the printing step is performed in a client computer.

16. A method for printing items comprising the data  
15 processing system implemented steps of:  
    receiving a request to print a current item, wherein additional items are associated with the current item in relationship in which the additional items are on levels below the current item;  
20      printing the current item;  
    determining whether additional items on levels below the current item are to be printed; and  
    responsive to a determination that additional items are to be printed, printing the additional items.

25

17. The method of claim 16, wherein the items are web pages associated using universal resource identifiers.

18. The method of claim 16, wherein the items are files  
30 associated using directories.



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19. A data processing system for printing web pages, the data processing system comprising:

receiving means for receiving a request to print a web page; and

5       printing means for printing the web page and each web page associated with the web page on selected levels below the web page.

20. The data processing system of claim 19, wherein the  
10       printing means comprises:

sending means for sending the web page and each web page associated with the web page on selected levels below the web page to a printer.

15       21. The data processing system of claim 19, wherein the printing means comprises:

sending means for sending the web page and each web page associated with the web page on selected levels below the web page to a display device.

20       22. The data processing system of claim 19, wherein the printing means comprises:

25       sending means for sending the web page and each web page associated with the web page on selected levels below the web page to a file.

23. The data processing system of claim 19, wherein the data processing system is a client computer.

30       24. The data processing system of claim 19, wherein the data processing system is a web server.

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25. A data processing system for printing web pages, the data processing system comprising:

5 determining means, responsive to an input selecting a current web page for printing, for determining whether a maximum depth for printing has been reached;

identifying means for identifying a set of universal resource identifiers located within the current web page in response to the maximum depth being unreached;

10 retrieving means for retrieving the web page identified by the set of uniform resource locators; and printing means for printing each web page retrieved.

26. The data processing system of claim 25 further comprising:

repeating the determining means, identifying means, retrieving means, and printing means for each web page until the maximum depth has been reached.

20 27. The data processing system of claim 25, wherein the printing means comprises sending each web page to an output device.

28. The data processing system of claim 27, wherein the output device is a printer.

29. The data processing system of claim 27, wherein the output device is a display device.

30 30. The data processing system of claim 25, wherein the data processing system is a client computer.

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31. The data processing system of claim 25, wherein the data processing system is a web server.

5 32. The data processing system of claim 25, wherein the determining means, identifying means, and retrieving means are performed in a web server and wherein the printing means is performed in a client computer.

10 33. A computer program product in a computer readable medium for printing web pages, the computer program product comprising:

first instructions for receiving a request to print a web page; and

15 second instructions for printing the web page and each web page associated with the web page on selected levels below the web page.

20 34. A computer program product in a computer readable medium for printing web pages, the computer program product comprising:

first instructions, responsive to an input selecting a current web page for printing, for determining whether a maximum depth for printing has been reached;

25 second instructions for identifying a set of universal resource identifiers located within the current web page in response to the maximum depth being unreached;

30 third instructions for retrieving the web page identified by the set of uniform resource locators; and fourth instructions for printing each web page

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retrieved.

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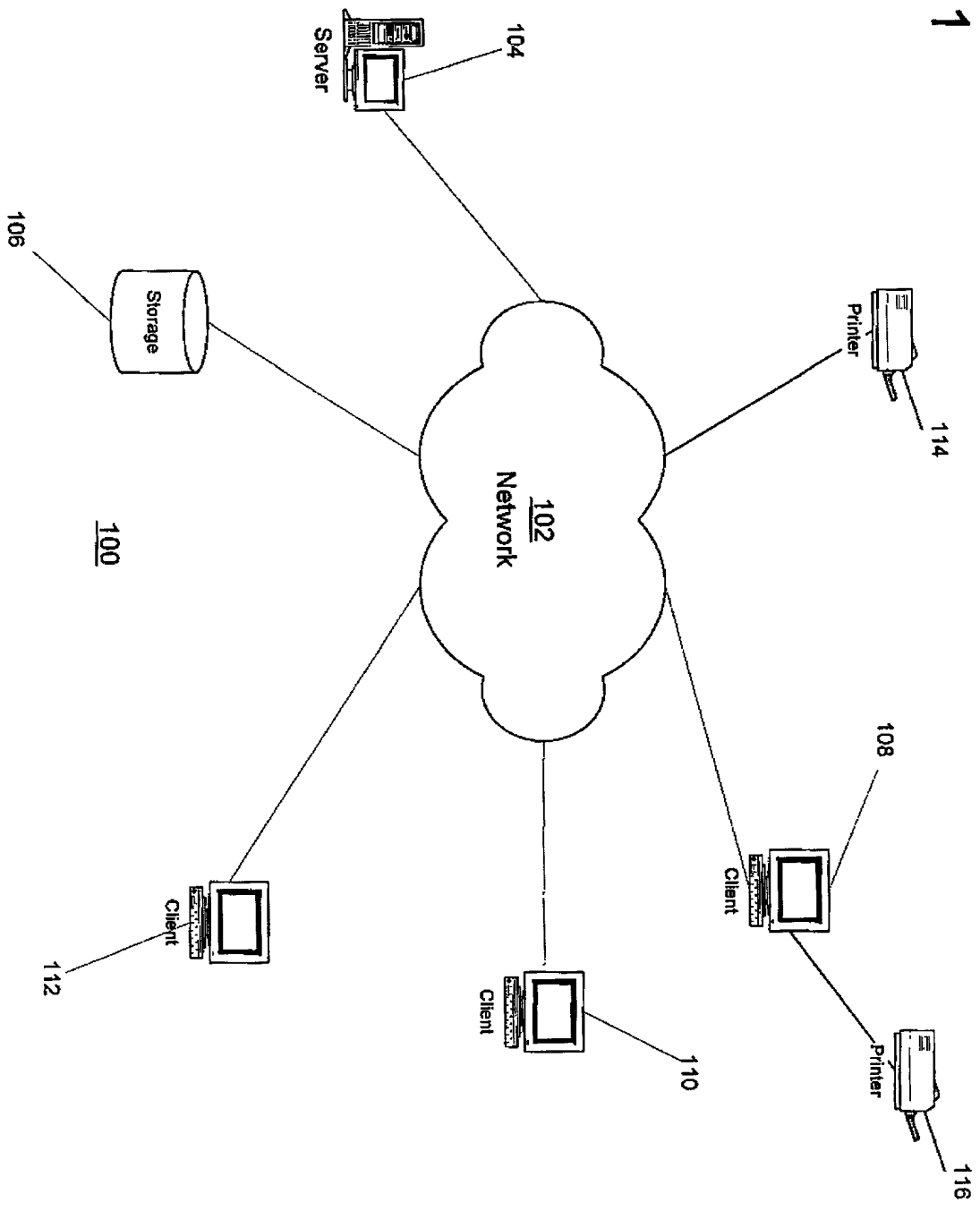
[illegible][illegible][illegible]

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[illegible][illegible]

Figure 1

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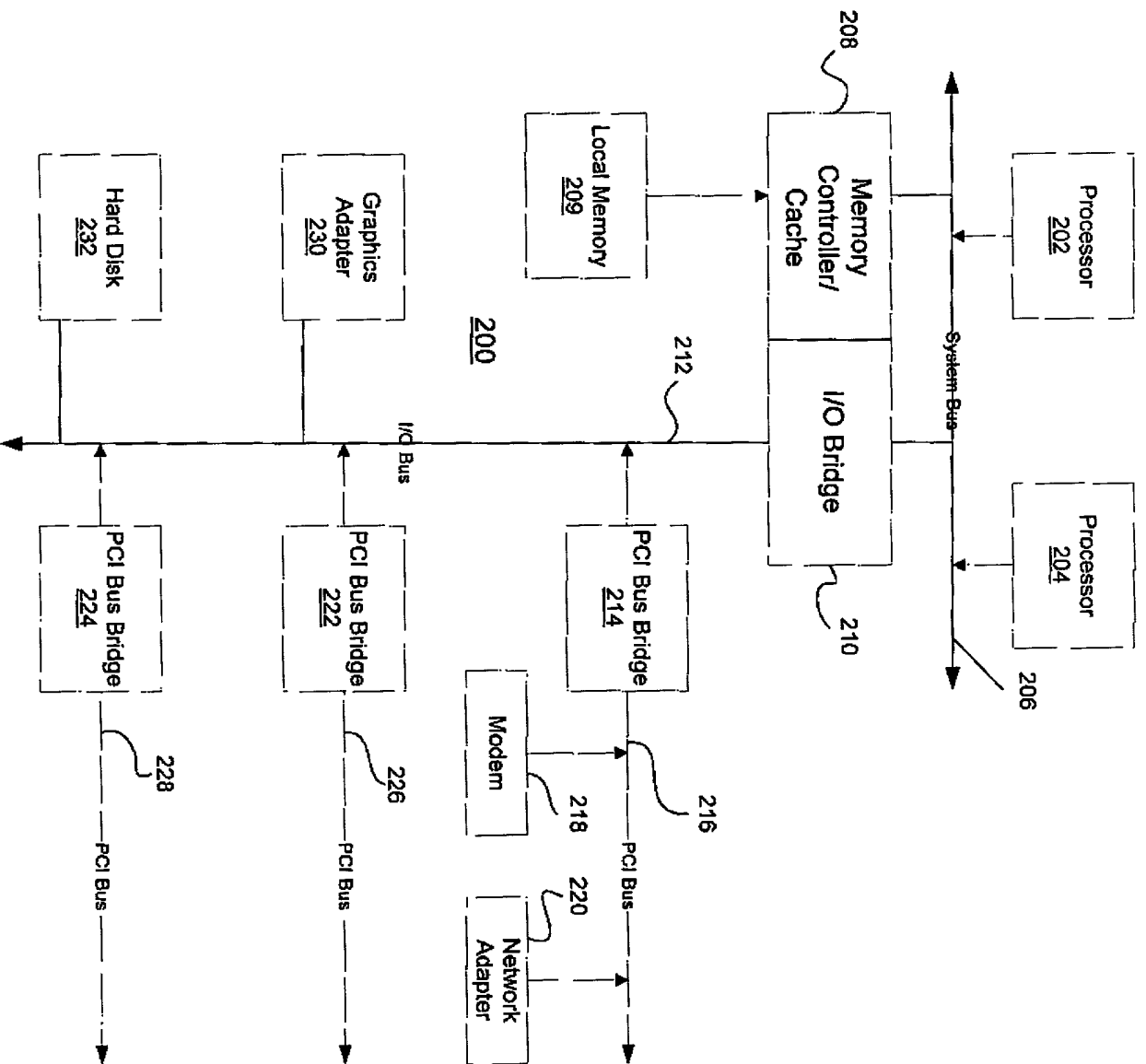


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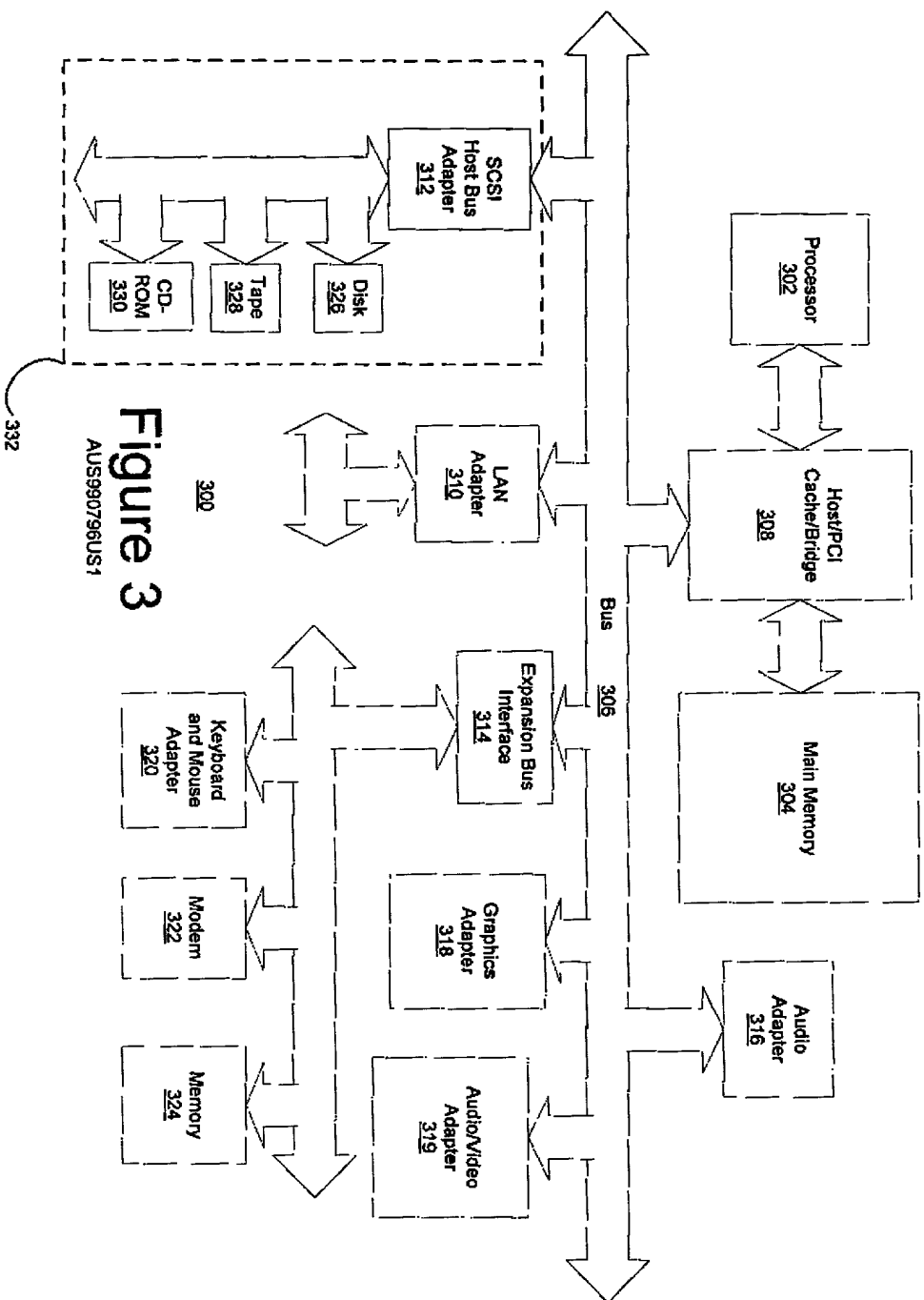
# Figure 2

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server

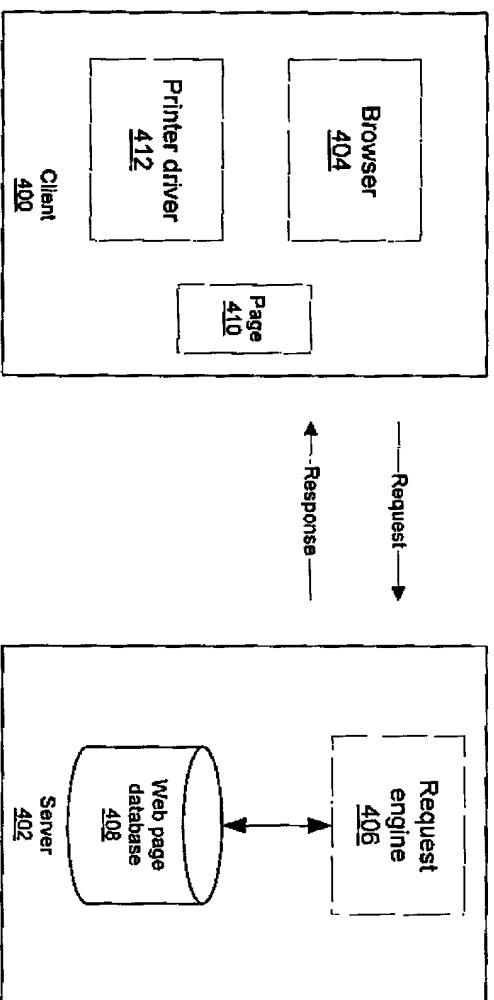


Client



**Figure 3**  
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**Figure 4**

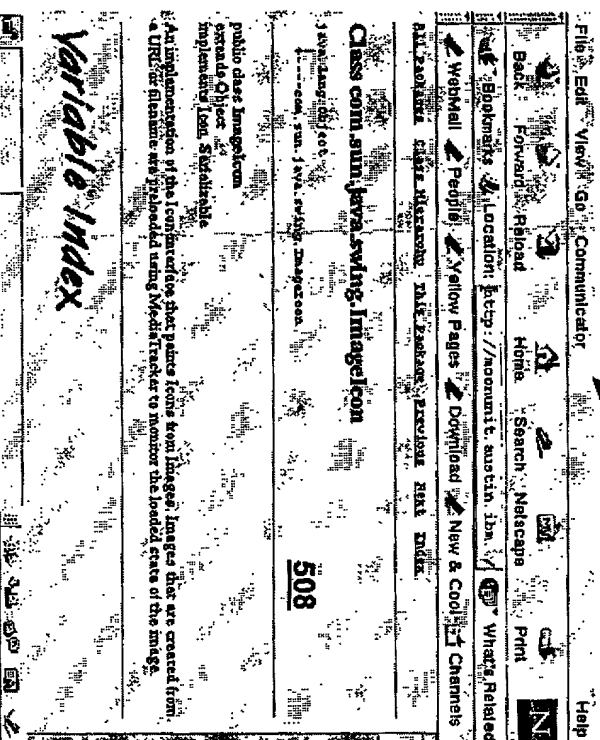
AUS980796US1



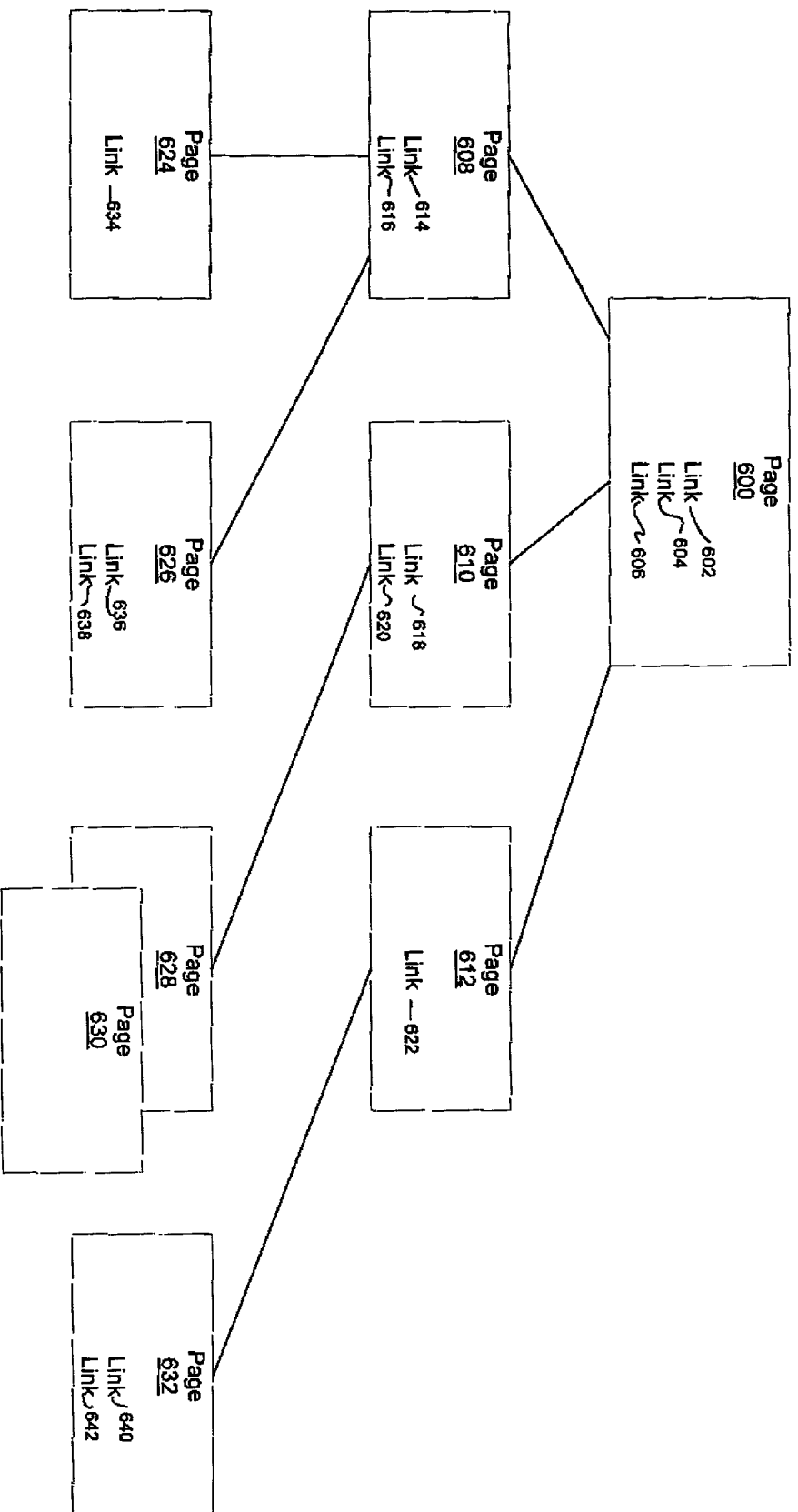
## Print Level 0



## Print Level 1

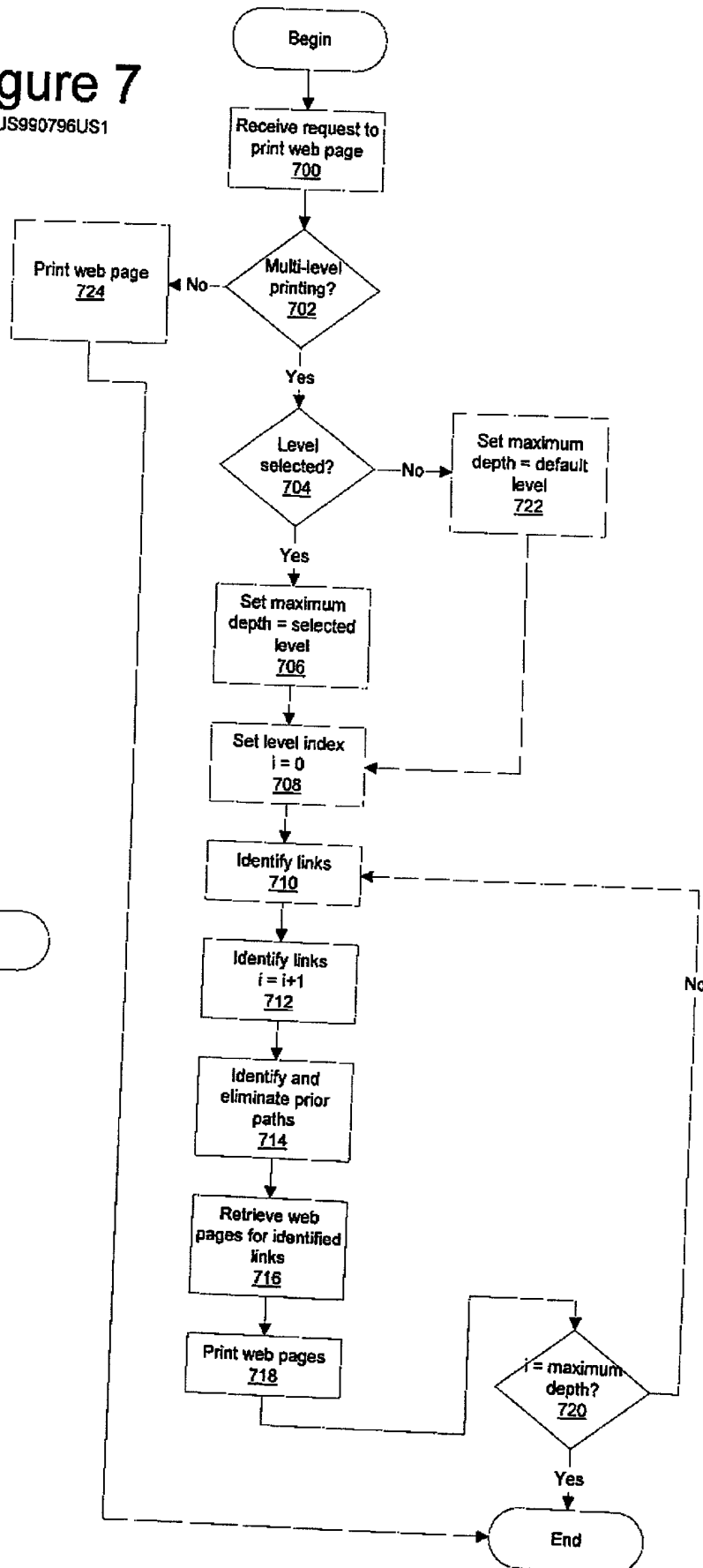


**Figure 6**  
AUS980796US1



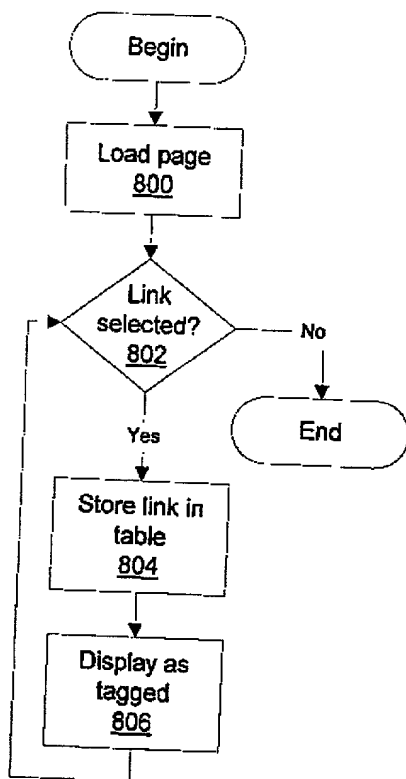
# Figure 7

AUS990796US1



# Figure 8

AUS990796US1



**DECLARATION AND POWER OF ATTORNEY FOR  
PATENT APPLICATION**

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name;

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

**METHOD AND APPARATUS FOR PRINTING WEB PAGES**

the specification of which (check one)

X is attached hereto.

— was filed on \_\_\_\_\_  
as Application Serial No. \_\_\_\_\_  
and was amended on \_\_\_\_\_  
(if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the patentability of this application in accordance with Title 37, Code of Federal Regulations, §1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s): Priority Claimed  
\_\_\_\_ Yes \_\_\_\_ No  
\_\_\_\_ (Number) \_\_\_\_\_ (Country) \_\_\_\_\_ (Day/Month/Year)

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose information material to the patentability of this application as defined in Title 37, Code of Federal Regulations, §1.56 which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

\_\_\_\_ (Application Serial #) \_\_\_\_\_ (Filing Date) \_\_\_\_\_ (Status)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorneys and/or agents to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

John W. Henderson, Jr., Reg. No. 26,907; Thomas E. Tyson, Reg. No. 28,543; James H. Barksdale, Jr., Reg. No. 24,091; Casimer K. Salys, Reg. No. 28,900; Robert M. Carwell, Reg. No. 28,499; Douglas H. Lefevre, Reg. No. 26,193; Jeffrey S. LaBaw, Reg. No. 31,633; David A. Mims, Jr., Reg. 32,708; Volel Emile, Reg. No. 39,969; Anthony V. England, Reg. No. 35,129; Leslie A. Van Leeuwen, Reg. No. 42,196; Christopher A. Hughes, Reg. No. 26,914; Edward A. Pennington, Reg. No. 32,588; John E. Hoel, Reg. No. 26,279; Joseph C. Redmond, Jr., Reg. No. 18,753; Marilyn S. Dawkins, Reg. No. 31,140; Mark E. McBurney, Reg. No. 33,114; Duke W. Yee, Reg. No. 34,285; Colin P. Cahoon, Reg. No. 38,836; Joseph R. Burwell, Reg. No. 44,468; Rudolph J. Buchel, Reg. No. 43,448; and Stephen R. Loe, Reg. No. 43,757.

Send correspondence to: Duke W. Yee, Carstens, Yee & Cahoon, LLP, P.O. Box 802334, Dallas, Texas 75380 and direct all telephone calls to Duke W. Yee, (972) 367-2001

FULL NAME OF SOLE OR FIRST INVENTOR: SANAA F. ABDELHADI

INVENTORS SIGNATURE: [Signature] DATE: 11/18/99

RESIDENCE: 12113 METRIC BLVD. #631  
AUSTIN, TEXAS 78758

CITIZENSHIP: UNITED STATES

POST OFFICE ADDRESS: SAME AS ABOVE

FULL NAME OF SECOND INVENTOR: MARITZA BORUNDA

INVENTORS SIGNATURE: [Signature] DATE: 11/18/1999

RESIDENCE: 2801 WELLS BRANCH PKWY. #1638  
AUSTIN, TEXAS 78728

CITIZENSHIP: UNITED STATES

POST OFFICE ADDRESS: SAME AS ABOVE

FULL NAME OF THIRD INVENTOR: HYPATIA ROJAS

INVENTORS SIGNATURE: [Signature] DATE: 11/18/99

RESIDENCE: 1814 CHINCOTEAGUE WAY  
ROUND ROCK, TEXAS 78681

DOCKET NUMBER: AUS990796US1

CITIZENSHIP: UNITED STATES

POST OFFICE ADDRESS: SAME AS ABOVE